

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Currently Amended) A periodic control-~~synchronous~~ synchronizing system for synchronizing periodic control between a controller connected in a network and devices connected to said network, wherein

said controller includes a first global timer and each of said devices comprises a respective second global timer controlled by said controller through said network, each of said devices further including

an operation period timer which ~~controls an operation period~~ generates a synchronizing time for synchronizing periodic control of said device ~~itself~~; and

a timer-~~synchronous~~ synchronizing unit which

determines a first time difference between a global time, indicated by said second global timer of said device, at the synchronizing time, and a ~~synchronous timing~~ synchronizing time indicated by said ~~controller~~ first global timer, and ~~which~~

determines a timer correction value of said operation period timer, based on the first time difference, wherein said operation period timer is corrected by said timer-~~synchronous~~ synchronizing unit, based on the timer correction value, ~~at a synchronous timing indicated by said operation period timer~~ the synchronizing time.

2. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 1, wherein

said first global timer of said controller is a master global timer,

each of said second global timers of said devices is a slave global timer,

said controller comprises a transmitting unit which transmits the ~~synchronous timing~~synchronizing time, using global time indicated by the master global timer, to said devices as a ~~period~~periodic transfer packet, and

each of said devices comprises a periodic control unit which performs periodic control using the ~~synchronous timing~~synchronizing time of the periodic transfer packet transmitted by said transmitting unit and the global time indicated by said slave global timer.

Claim 3 (Cancelled).

4. (Currently Amended) The periodic control ~~synchronous~~synchronizing system according to claim 1, wherein said timer ~~synchronous~~synchronizing unit includes a detecting unit which detects whether the first time difference is within an allowable range, corrects said operation period timer based on the timer correction value when the time difference is within an allowable range, and does not correct said operation period timer when the time difference is outside of the allowable range.

5. (Currently Amended) The periodic control ~~synchronous~~synchronizing system according to claim 1, wherein ~~each of said controllers~~controller further includes

a control period timer which controls ~~an~~a control period of said controller ~~itself~~, and

a timer ~~synchronous~~synchronizing unit which
corrects said control period timer by determining a second time difference between the global time, indicated by said first global timer of said controller, and the ~~synchronous timing~~synchronizing time indicated by said controller, at a ~~synchronous~~ timing indicated by said control period timer, and
determines a timer correction value of said control period timer based on the second time difference.

6. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 5, wherein said timer-~~synchronous~~ synchronizing unit detects whether the first time difference is within a specified allowable range, corrects said control period timer based on the timer correction value when the first time difference is within an allowable range, and does not correct said control period timer when the first time difference is outside of the allowable range.

7. (Currently Amended) A periodic control-~~synchronous~~ synchronizing system for synchronizing periodic control between a controller connected in a network and devices connected to said network, wherein

said controller includes

a first global timer;

a control period timer which ~~controls~~ generates a control period for periodic control of said controller;

a time stamp providing unit which provides a periodic transfer packet with a time stamp showing a ~~synchronous timing~~ synchronizing time of the control period, indicated by said control period timer, using global time indicated by said first global timer; and

a transmitting unit which transmits the periodic transfer packet provided with the time stamp to said devices, and

each of said devices includes

a second global timer controlled through said network;

a periodic control unit which synchronizes operation period of said device with the control period using the ~~synchronous timing~~ synchronizing time of the periodic control, indicated by the time stamp of the periodic transfer packet transmitted by said transmitting unit, and global time indicated by said second global timer;

an operation period timer which ~~controls operation period~~ generates a synchronizing time for synchronizing periodic control of said device ~~itself~~; and

a comparing unit which

compares the ~~synchronous timing~~ synchronizing time of the periodic control, indicated by the time stamp of the periodic transfer packet transmitted by said transmitting unit, and the global time indicated by said second global timer, ~~and~~

~~which~~ determines a time difference between the ~~synchronous timing~~ synchronizing time of the periodic control, indicated by the time stamp compared by said comparing unit, and the global time indicated by said second global timer, and

determines a timer correction value of said operation control period timer based on the time difference, wherein said operation period timer is corrected by said comparing unit, based on the timer correction value, ~~at a synchronous timing indicated by said operation period timer~~ the synchronizing time.

8. (Currently Amended) The periodic control ~~synchronous~~ synchronizing system according to claim 7, wherein

said controller comprises a latch unit which latches the global time of said first global timer, and holds the time latched,

said control period timer latches the global time of said first global timer in said latch unit at the ~~synchronous timing~~ synchronizing time of the periodic control indicated by said control period timer, and

said time stamp providing unit provides the periodic transfer packet with the time stamp having the global time latched by said latch unit, offset by a portion of the control period.

Claim 9 (Cancelled).

10. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 7, wherein said comparing unit, which detects whether the time difference is within an allowable range, corrects said operation period timer, based on the timer correction value, when the time difference is within the allowable range, and does not correct said operation period timer when the time difference is outside of the allowable range.

11. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 7, wherein said comparing unit resets said operation period timer when the global time, indicated by said second global timer, reaches the ~~synchronous-timing~~ synchronizing time of the periodic control indicated by the time stamp.

12. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 11, wherein said comparing unit resets said operation period timer when reaching the ~~synchronous-timing~~ synchronizing time, indicated by said operation period timer, before the global time, indicated by said second global timer, reaches the ~~synchronous-timing~~ synchronizing time of the periodic control, indicated by the time stamp, and resets said operation period timer again, later, when the ~~synchronous-timing~~ synchronizing time of the periodic control, indicated by the time stamp, at least reaches the global time indicated by said second global timer.

13. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 11, wherein said comparing unit, which detects whether the time difference between the ~~synchronous-timing~~ synchronizing time of the periodic control, indicated by the time stamp, compared by said comparing unit, and the global time, indicated by said second global timer, at the ~~synchronous-timing~~ synchronizing time, indicated by said operation period timer, is within an allowable range, and does

not correct said operation period timer when the time difference is outside of the allowable range.

14. (Currently Amended) The periodic control-~~synchronous~~ synchronizing system according to claim 11, wherein said comparing unit determines a timer period correction value of said operation period timer from the time difference between the ~~synchronous timing~~ synchronizing time of the periodic control₁ indicated by the time stamp₁ and the global time₁ indicated by said second global timer, and thereby corrects said operation period timer based on the timer period correction value.

Claims 15 and 16 (Cancelled).